the free surface of the water the pressure will be equal to the pressure of a column of air whose height is measured by *H+5* and whose weight is 1.29*X(H+d)* kg. This column of air is in equilibrium with a column of hydrogen whose height is *H* and with a column of water with a height <5, the existence of which can only be explained by a rarefaction of the hydrogen in the bottom of the vessel *B.* It is on account of this rarefaction that the equilibrium at the top may be maintained by the drop of water.

It is not difficult to compute the value of this depression by means of the general formula:

O *0*

- 5 = #-1.29-0.06927-(ff+S)-1.29.

I

i
I

FIG. 21.

It may be noted that this is what takes place in all chimneys (Fig. 21), which are simply open-topped enclosures filled with a light gas. As in the preceding case, the waste

gases ng ch amber of an open-hearth
the base of the chimney have pressure *less than* pressure of atmosphere. This phenomenon is well known as the draught produced by the chimney.

The following problem remains to be considered: In the heating chamber of an open-hearth furnace the pressure of the hot gases is in equilibrium with the atmospheric pressure. From the heating chamber the gases at a temperature of 1600° pass to the regenerators. Therein they give up a portion of their heat and are finally reduced to a temperature of 400° at the chimney. The weight of a cubic meter of these gases being 1 kg 30, what is the hydrostatic pressure which will be found at the level of the bottom of the regenerators, when the distance down from the heating chamber is 6 m? From what has gone before it may be seen that the pressure at the level of the bottom of the regenerators will be negative. In order to set the hot and light gases in motion and cause them to descend through the regenerator, the chimney must draw these gases from the heating chamber and accordingly

[C1] *Note by English translator*. — Very often the waste gases in the chimney do not fill the entire area of the stack, due to their high ascensional velocity.